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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,365	12/09/2003	Kenneth Boyd	81044284FGT1838PUS	1364

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EXAMINER	
THORNEWELL, KIMBERLY A	
ART UNIT	PAPER NUMBER
2128	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/707,365	BOYD ET AL.	
	Examiner	Art Unit	
	Kimberly Thornewell	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-14 and 16-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-14, 16-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-29 were originally presented for examination. In the Office Action dated 8/25/2006, claims 1-29 were rejected. In the reply dated 11/27/2006, the Applicant amended claims 1, 7, 9-12, 18-22, and 24-25, and cancelled claims 6 and 15. Therefore claims 1-5, 7-14, and 16-29 remain pending in the instant application.

Response to Arguments

Double Patenting:

2. The terminal disclaimer filed on 11/27/2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of the present application in view of co-pending application 10/707,368 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Specification:

3. The Examiner thanks the Applicant for amending the title in order to align with the claims. Accordingly, the objection to the title of the application is withdrawn.

Claim Rejections, 35 USC 112:

4. The amendment to claims 9 and 18 overcome the rejection for lack of antecedent basis for the term "previous steering wheel angle." The amendment to claim 21 clarifies that a plurality of steering wheel angle inputs are determined, each associated with a different time stamp. The amendment to claim 24 provides sufficient antecedent basis for the term

"normalized yaw acceleration." Accordingly, the rejection of claims 9-11 and 18-29 under 35 USC 112, second paragraph, is withdrawn.

Claim Rejections, 35 USC 101:

5. The Applicant amended claims 12 and 21 in order to recite a step of outputting results of the operating step of the methods. In view of these amendments, and in view of the portion of the specification relating to outputs for the computer models (paragraphs [0024]-[0026]), the rejection of the claims under 35 USC 101 is withdrawn.

Claim Rejections, 35 USC 102/103:

6. Applicant's arguments with respect to claims 1-5, 7-14, and 16-29 have been considered but are moot in view of the new ground(s) of rejection.

However, as per independent claims 1 and 12, the Applicant argued that the Ravini reference does not disclose the step of when the error decreases, operating the computer model with the first steering wheel angle input. The Examiner respectfully traverses this argument because as shown in Figure 6B of the reference shows the error with respect to time. At t=5s, the error is shown to decrease. Figure 6D shows the steering wheel angle input with respect to time. Claims 1 and 12 only define the "first" steering wheel angle input to be determined at a time later than the initial steering wheel angle input. In Figure 6D of the reference, after t=5s (the same time at which the error is decreasing in figure 6B), the steering input is maintained at an angle that was determined at a previous time point, but after the time of the initial steering wheel angle

input. Therefore the Examiner maintains that the Ravini reference meets this requirement of claims 1 and 12.

As per claim 20, the Applicant argued that the Ravini reference does not disclose holding the steering wheel angle to a first steering wheel angle input out of the plurality of steering wheel angles until an error is decreasing; or when the error decreases, operating the computer model with one of the plurality of steering wheel angle inputs subsequent to the first steering wheel angle input. The Examiner respectfully traverses because as shown in figure 6D, one of the first steering wheel angle inputs is maintained until t=5s, which is the same time as when the error decreases, as shown in figure 6B. As the error decreases after t=5s, the steering wheel angle is maintained at another steering wheel angle that was stored subsequent to the first steering wheel angle.

Claim Objections

7. Claims 4-5 and 13-14 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 4-5 and 13-14 only contain subject matter that is present in the amendments of independent claims 1 and 12.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-5, 7-9, 12-14, 16-18, 21-22 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ravini et al., US Patent no. 5,979,581, in view of Ghoneim et al., US Patent no. 6,205,391.

As per claim 1,

Ravani discloses a simulation system for simulating an operation of an automotive vehicle comprising:

- In input providing vehicle information **(figure 1 reference 12)** and path information **(figure 1 reference 20)**; and
- A controller coupled to the input **(figure 1 reference 16)**, said controller having a vehicle computer model therein **(column 5 lines 57-59)**, said controller programmed to:
    - Determine an initial steering wheel angle input to the computer model **(column 8 lines 13-19**, *initial steering wheel angle input taught as 0 for a straight roadway*);
    - Determine a first steering wheel angle input to the computer model at a time later than the initial steering wheel angle input by comparing a look ahead point and an intended path (**column 2 line 39-42**);

- Operate the computer model with the initial steering wheel angle input until an error of the first steering wheel angle and the initial steering wheel angle is decreasing (**figures 6b and 6d**, *shown as steering input remaining at 0 until t=5s*);
- When the error decreases, operate the computer model with the first steering wheel angle input (**figures 6b and 6d**, *shown as steering input being above 0 when t>5s*); and
- Generate an output in response to the vehicle model and the initial steering wheel input or the first steering wheel input (**column 8 lines 52-57**).

Ravini does not disclose expressly the operating the computer model with the initial steering wheel angle until the error is decreasing when the vehicle is understeering, or the controller determining when the vehicle model is understeering in response to a yaw acceleration greater than a threshold and an increasing steering wheel angle. Ghoneim discloses estimation of vehicle yaw, wherein understeer (instability) is determined in response to a yaw acceleration greater than a threshold (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

It would have been obvious for one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Ravini's system for simulating operation of an automotive vehicle with Ghoneim's method for determining when the vehicle is understeering. It would have further been obvious to apply Ravini's step of operating the computer model with the initial steering wheel angle input until the error decreases at a time when the vehicle is understeering because Ghoneim teaches inputting a measured steering wheel angle when the

vehicle is in an instable (understeering) mode and error is present (**column 3 lines 8-22**, *invalid yaw rate*), in order to reduce the error and re-validate the yaw rate. The motivation for doing so would have been to improve accuracy of steering by providing a valid yaw rate and keeping a vehicle from becoming instable (Ghoneim column 1 lines 32-57).

As per claim 2,

Ravani discloses the controller controlling an output device in response to the vehicle model and the initial steering wheel input (**column 8 lines 52-57**).

As per claim 3,

Ravani discloses the model comprising a dynamic control model **(column 5 lines 57-59)**.

As per claim 4,

Ghoneim discloses the controller determining when the vehicle model is understeering in response to a yaw acceleration (**column 5 lines 18-35**).

As per claim 5,

Ravani discloses the controller determining when the vehicle model is understeering in response to a yaw acceleration (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

As per claim 7,

Ravani discloses the controller determining an increasing steering wheel angle by comparing the initial steering wheel angle input to the first steering wheel angle input (**column 7 lines 32-35**).

As per claims 8 and 9,

Ravani discloses the controller determining the error in response to a decreasing steering wheel angle and the initial steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**).

As per claim 12,

Ravani discloses a method of operating a vehicle computer model having vehicle information **(figure 1 reference 12)** and path information **(figure 1 reference 20)** therein, the method operating on a digital computer system and comprising:

- Determining an initial steering wheel angle input to the computer model **(column 8 lines 13-19,** *initial steering wheel angle input taught as 0 for a straight roadway*);
- Determining a first steering wheel angle input to the computer model at a time later than the initial steering wheel angle input by comparing a look ahead point and an intended path (**column 2 line 39-42**);
- Operating the computer model with the initial steering wheel angle input until an error of the first steering wheel angle and the initial steering wheel angle is

decreasing (**figures 6b and 6d,** *shown as steering input remaining at 0 until t=5s*);

- When the error decreases, operating the computer model with the first steering wheel angle input (**figures 6b and 6d,** *shown as steering input being above 0 when t>5s*); and
- Outputting results of the operating step (**column 8 lines 52-57**).

Ravini does not disclose expressly the operating the computer model with the initial steering wheel angle until the error is decreasing when the vehicle is understeering, or the controller determining when the vehicle model is understeering in response to a yaw acceleration greater than a threshold and an increasing steering wheel angle. Ghoneim discloses estimation of vehicle yaw, wherein understeer (instability) is determined in response to a yaw acceleration greater than a threshold (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

It would have been obvious for one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Ravini's method of operating an automotive vehicle with Ghoneim's method for determining when the vehicle is understeering. It would have further been obvious to apply Ravini's step of operating the computer model with the initial steering wheel angle input until the error decreases at a time when the vehicle is understeering because Ghoneim teaches inputting a measured steering wheel angle when the vehicle is in an instable (understeering) mode and error is present (**column 3 lines 8-22**, *invalid yaw rate*), in order to reduce the error and re-validate the yaw rate. The motivation for doing so would have

been to improve accuracy of steering by providing a valid yaw rate and keeping a vehicle from becoming instable (Ghoneim column 1 lines 32-57).

As per claims 13 and 14,

Ghoneim discloses determining when the vehicle model is understeering in response to a yaw acceleration (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

As per claim 16,

Ravani discloses determining an increasing steering wheel angle by comparing the initial steering wheel angle input to the first steering wheel angle input (**column 7 lines 32-35**).

As per claims 17 and 18,

Ravani discloses determining the error in response to a decreasing steering wheel angle and the previous steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**).

As per claim 21,

Ravani discloses a method of operating a vehicle computer model having vehicle information **(figure 1 reference 12)** and path information **(figure 1 reference 20)** therein, the method operating on a digital computer system and comprising:

- Determining a plurality of steering wheel angle inputs, each associated with a different time stamp, to the computer model by comparing a look ahead point and an intended path at various times (**figure 6, column 8 lines 13-19**);
- Holding the steering wheel angle to a first one of the plurality of steering wheel angle inputs until an error determined as a function of the plurality of steering wheel angle inputs is decreasing (**figures 6b and 6d,** *shown as steering input remaining at 0 until t=5s*);
- When the error decreases, operating the computer model with one of the plurality of current steering wheel angle inputs subsequent to the first steering wheel angle input (**figures 6b and 6d,** *shown as steering input being above 0 when t>5s*); and
- Outputting results of the operating step (**column 8 lines 52-57**).

Ravini does not disclose expressly the operating the computer model with the initial steering wheel angle until the error is decreasing when the vehicle is understeering, or the controller determining when the vehicle model is understeering in response to a yaw acceleration greater than a threshold and an increasing steering wheel angle. Ghoneim discloses estimation of vehicle yaw, wherein understeer (instability) is determined in response to a yaw acceleration greater than a threshold (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

It would have been obvious for one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Ravini's method of operating an automotive vehicle with Ghoneim's method for determining when the vehicle is understeering. It would have further been obvious to apply Ravini's step of operating the computer model with the initial

steering wheel angle input until the error decreases at a time when the vehicle is understeering because Ghoneim teaches inputting a measured steering wheel angle when the vehicle is in an instable (understeering) mode and error is present (**column 3 lines 8-22**, *invalid yaw rate*), in order to reduce the error and re-validate the yaw rate. The motivation for doing so would have been to improve accuracy of steering by providing a valid yaw rate and keeping a vehicle from becoming instable (Ghoneim column 1 lines 32-57).

As per claim 22,

Ravani discloses determining a plurality of current steering wheel angle inputs comprising periodically determining the plurality of current steering wheel angle inputs (**figure 6d, taught as the steering inputs being determined as a function of time**).

As per claim 25,

Ravani discloses operating the computer model with one of the plurality of current steering wheel angle inputs subsequent to the first steering wheel angle input comprising operating the computer model with one of the plurality of current steering wheel angle inputs subsequent to the first steering wheel angle input that corresponds in time to a decreased error (**column 8 lines 54-57**).

As per claims 26 and 27,

Ravani discloses determining the error in response to a decreasing steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**).

10. Claims 11-12, 19-20, 23-24, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ravani in view of Ghoneim as applied to claims 1-5, 7-9, 12-14, 16-18, 21-22 and 25-27, and further in view of Yasui, US Patent no. 5,373,911.

As per claims 11-12, 19-20 and 28-29,

Ravani discloses determining error in response to a decreasing steering wheel angle and the previous steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**). Neither Ravani nor Ghoneim disclose, however, the error being determined in response to a difference of the previous steering wheel angle and the first steering wheel angle input compared to a threshold. Yasui discloses a vehicle steering system that determines error by a difference of a previous steering wheel angle and the first ("desired") steering wheel angle (**column 7 line 62-column 8 line 1**).

It would have been obvious to one of ordinary skill in the art of vehicle simulation, at the time of the present invention, to modify Ravani/Ghoneim's steering simulator with Yasui's error detection method in order to achieve a steering simulator that determines error by comparing a difference of a desired steering wheel angle with a previously determined steering wheel angle against a threshold. The motivation for doing so would have been to improve automatic guidance of an automotive vehicle by detecting malfunction (Yasui column 2 lines 3-7).

11. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ravani in view of Ghoneim as applied to claims 1-5, 7-9, 12-14, 16-18, 21-22 and 25-27, and furhter in view of Nagaoka, Japanese patent 07-320188.

As per claims 23 and 24,

Neither Ravani nor Ghoneim disclose expressly the yaw acceleration comprising a normalized yaw acceleration. Nagaoka discloses a method for estimating the yaw rate of a vehicle using the steering angle, wherein the normalized yaw acceleration comprises a steering wheel angle normalized yaw acceleration (**abstract of invention, constitution**).

It would have been obvious to one of ordinary skill in the art of vehicle simulation, at the time of the present invention, to modify Ravani/Ghoneim's steering simulator with Nagaoka's use of *normalized* yaw acceleration based on the steering wheel angle in order to achieve a simulation method that determines understeering in response to a steering wheel angle normalized yaw acceleration. The motivation for doing so would have been reduce the burden of a computer operating the computer model by using a presumed yaw acceleration (Nagaoka paragraphs 0005 and 0006).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Thornewell whose telephone number is (571)272-6543. The examiner can normally be reached on 9am-5:30pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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